RECLAMATION
Managing Water in the West

Guidelines for Soil or Water Corrosivity Testing

In the case where structures are to be in direct contact with soil or water, TSC-MERL recommends the following corrosivity tests*:

Chloride Concentration: by ion chromatography per ASTM D4327 or EPA 300.0; alternately per ASTM D512

- Chloride ions can enhance corrosion of metals.

Sulfate Concentration: by ion chromatography per ASTM D4327 or EPA 300.0; alternately per ASTM D516 or C1580

- Soils and waters high in sulfates can produce sulfate attack in some types of concrete which deteriorates the mechanical properties of the concrete.

pH: per ASTM D1293 or D4972/G51

- An acidic soil or water can indicate a higher risk for corrosion of metals and concrete.

Resistivity or Electrical Conductivity: by the Wenner 4-pin method per ASTM G57 or conductivity probe per ASTM D1125

- Resistivity/conductivity of soil and water is often directly associated with corrosivity.

* We recognize that not all testing labs follow the same procedures and that some localities may have their own specifications for testing. The TSC-MERL staff is familiar with many of the states' standard test methods and will be happy to assist you in verifying test procedures. Technical Memorandum MERL-2013-39 describes the testing methods used at TSC-MERL and is available on request.

TSC-MERL staff is happy to directly coordinate soil and water chemistry testing. USBR has some in-house testing capabilities, and MERL staff has contacts at several outside labs.

Contact for soil and water chemistry testing pertaining to corrosion and concrete:

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Water Sampling Instructions

1. Use clean high density polyethylene bottle, 1 Liter size; use clean hands or latex gloves
2. Rinse the bottle with sample water three times before collecting sample.
3. Fill bottle completely and seal tightly
4. Label the bottle with permanent marker or water-proof label:
    a. sample location (GPS coordinates, if available)
    b. date and time
    c. name of sample
    d. name of project
    e. field pH, when available
5. Place sample on ice in a picnic cooler (must survive shipping!)
6. Fill out sample request form, place in ziploc bag, and place in cooler
7. Seal the cooler with strapping tape and ship to the lab

Soil Sampling Instructions

1. Use clean ziploc bag, 1 quart; use clean hands or latex gloves
2. Use a rust-free tool (ideally stainless steel) to collect sample
3. Fill the bag with soil (min. 1 lb), remove as much air as possible, and seal tightly. Double-bagging is appreciated for moist samples.
4. Label the bag with permanent marker or water-proof label:
    a. sample location (GPS coordinates, if available) and depth of sample
    b. date and time
    c. name of sample
    d. name of project
    e. field pH, when available
5. Place sample on ice in a picnic cooler (must survive shipping!)
6. Fill out sample request form, place in ziploc bag, and place in cooler
7. Seal the cooler with strapping tape and ship to the lab

Notes: Chloride testing requires no preservatives, but testing should be performed within 28 days of sample collection. Sulfate testing recommends that the sample be kept cool at ~40^{o}F. Testing should also be performed within 28 days of sample collection. Samples for soil box testing of resistivity must maintain the original moisture content for an accurate measurement.